CLAIMS

1. An electromagnetic lens comprising:

an input section including a plurality of input probes and a curvilinear input reflector;

an output section including a plurality of output probes and a curvilinear output reflector; and

a coupling section including a coupling slot and a curvilinear coupling wall.

2. The electromagnetic lens as recited in claim 1, wherein the curvilinear input reflector comprises a non-circular conic section, the curvilinear output reflector comprises a linear section, and the curvilinear coupling wall comprises a parabolic section.

3. The electromagnetic lens as recited in claim 2, wherein the parabolic section of the curvilinear coupling wall is concave.

4. The electromagnetic lens as recited in claim 2, wherein the coupling slot comprises a parabolic section.

5. The electromagnetic lens as recited in claim 2, wherein the non-circular conic section of the curvilinear input reflector comprises at least one of a hyperbolic section, an elliptical section, and a parabolic section.

6. The electromagnetic lens as recited in claim 5, wherein the non-circular conic section is at least one of convex and concave.

7. The electromagnetic lens as recited in claim 1, wherein the curvilinear input reflector comprises a multi-foci extrapolated curved section, the curvilinear output reflector comprises an extrapolated curve section that is related to the multi-foci extrapolated curved section of the curvilinear input reflector, and the curvilinear coupling wall comprises a linear section.

8. The electromagnetic lens as recited in claim 7, wherein the coupling slot comprises a linear section.

9. The electromagnetic lens as recited in claim 7, wherein the extrapolated curve section of the curvilinear output reflector is related to the multi-foci extrapolated curved section of the curvilinear input reflector such that an electromagnetic wave emanating from at least one input probe of the plurality of input probes that is reflected from the curvilinear input reflector and directed through the coupling slot via the curvilinear coupling wall presents a linear phase front at the plurality of output probes after reflection from the curvilinear output reflector.

10. The electromagnetic lens as recited in claim 7, wherein the multi-foci extrapolated curved section provides a plurality of foci via a plurality of foci zones that are interconnected via a plurality of extrapolation zones.

11. The electromagnetic lens as recited in claim 10, wherein the plurality of foci comprises three, four, or five foci.

12. The electromagnetic lens as recited in claim 1, wherein the input section is formed, at least partially, from an input plate and a common plate that are substantially parallel to each other.

13. The electromagnetic lens as recited in claim 12, wherein the input section is also formed from at least part of an input spacer, the input spacer establishing the curvilinear input reflector.

14. The electromagnetic lens as recited in claim 1, wherein the output section is formed, at least partially, from a common plate and an output plate that are substantially parallel to each other.

15. The electromagnetic lens as recited in claim 14, wherein the output section is also formed from at least part of an output spacer, the output spacer establishing the curvilinear output reflector.

16. The electromagnetic lens as recited in claim 1, wherein the coupling slot comprises a gap and includes at least one bridge that extends across the gap for mechanical stability of the electromagnetic lens.

17. The electromagnetic lens as recited in claim 1, wherein the coupling slot enables electromagnetic waves to be coupled from the input section to the output section.

18. The electromagnetic lens as recited in claim 1, wherein the electromagnetic lens is configured so that: an electromagnetic wave emanating from at least one input probe of the plurality of input probes is guided along the input section to the coupling section, the electromagnetic wave is directed from the input section through the coupling slot to the output section, and the electromagnetic wave is guided along the output section to the plurality of output probes.

19. The electromagnetic lens as recited in claim 18, wherein the electromagnetic lens is further configured such that: the electromagnetic wave is guided along the input section from the plurality of input probes using the curvilinear input reflector, the electromagnetic wave is coupled from the input section to the output section via the coupling slot using the curvilinear coupling wall of the coupling section, and the electromagnetic wave is guided along the output section to the plurality of output probes using the curvilinear output reflector.

20. The electromagnetic lens as recited in claim 1, wherein the plurality of input probes comprises six input probes.

21. The electromagnetic lens as recited in claim 1, wherein the plurality of output probes comprises eight output probes.

22. The electromagnetic lens as recited in claim 1, wherein the plurality of input probes are proximate to the curvilinear input reflector, and the plurality of output probes are proximate to the curvilinear output reflector.

23. The electromagnetic lens as recited in claim 1, wherein the input section, the output section, and the coupling section comprise at least one electromagnetic medium.

24. The electromagnetic lens as recited in claim 23, wherein the at least one electromagnetic medium comprises air.

25. The electromagnetic lens as recited in claim 23, wherein the at least one electromagnetic medium comprises a non-air dielectric.

26. An access station comprising:

a lens including:

an input section including a plurality of input probes and a curvilinear input reflector;

an output section including a plurality of output probes and a curvilinear output reflector; and

a coupling section including a coupling slot and a curvilinear coupling wall.

27. The access station as recited in claim 26, further comprising:

an antenna array that is coupled to the plurality of output probes.

28. The access station as recited in claim 27, wherein the antenna array includes a plurality of antenna elements; and wherein each respective antenna element of the plurality of antenna elements is coupled to a respective output probe of the plurality of output probes.

29. The access station as recited in claim 28, wherein the plurality of antenna elements and the plurality of output probes both number eight.

30. The access station as recited in claim 26, further comprising:

one or more signal processors that are coupled to the plurality of input probes.

31. The access station as recited in claim 30, wherein the one or more signal processors include a plurality of processor interfaces; and wherein each respective processor interface of the plurality of processor interfaces is coupled to a respective input probe of the plurality of input probes.

32. The access station as recited in claim 31, wherein the plurality of processor interfaces and the plurality of input probes both number six.

33. The access station as recited in claim 26, wherein the access station comprises a Wi-Fi switch.

34. The access station as recited in claim 26, wherein the access station operates in accordance with at least one IEEE 802.11 standard.

35. The access station as recited in claim 26, wherein the curvilinear input reflector comprises a non-circular conic section, the curvilinear output reflector comprises a linear section, and the curvilinear coupling wall comprises a parabolic section.

36. The access station as recited in claim 26, wherein the curvilinear input reflector comprises a multi-foci extrapolated curved section, the curvilinear output reflector comprises an extrapolated curve section that is related to the multi-foci extrapolated curved section of the curvilinear input reflector, and the curvilinear coupling wall comprises a linear section.

37. The access station as recited in claim 26, wherein the lens is configured so that: an electromagnetic wave emanating from at least one input probe of the plurality of input probes is guided along the input section to the coupling section, the electromagnetic wave is directed from the input section through the coupling slot to the output section, and the electromagnetic wave is guided along the output section to the plurality of output probes.

38. The access station as recited in claim 37, wherein the lens is further configured such that: the electromagnetic wave is guided along the input section from the plurality of input probes using the curvilinear input reflector, the electromagnetic wave is coupled from the input section to the output section via the coupling slot using the curvilinear coupling wall of the coupling section, and the electromagnetic wave is guided along the output section to the plurality of output probes using the curvilinear output reflector.

39. An electromagnetic lens comprising:

an input section including a plurality of input probes and a curvilinear input reflector having a non-circular conic section;

an output section including a plurality of output probes and a linear output reflector; and

a coupling section including a coupling slot and a curvilinear coupling wall having a parabolic section.

40. The electromagnetic lens as recited in claim 39, wherein the parabolic section of the curvilinear coupling wall is concave and capable of collimating rays of a propagating electromagnetic wave.

41. The electromagnetic lens as recited in claim 39, wherein the coupling slot comprises a parabolic section.

42. The electromagnetic lens as recited in claim 39, wherein the non-circular conic section of the curvilinear input reflector comprises at least one of a hyperbolic section, an elliptical section, and a parabolic section.

43. The electromagnetic lens as recited in claim 42, wherein the non-circular conic section is at least one of convex and concave.

44. The electromagnetic lens as recited in claim 39, wherein the non-circular conic section of the curvilinear input reflector comprises a convex hyperbolic section.

45. An electromagnetic lens comprising:

an input plate;

an output plate;

a common plate having a coupling slot, the common plate located between the input plate and the output plate;

an input spacer having a hyperbolic input reflector and a parabolic input coupling wall, the input spacer located between the input plate and the common plate;

an output spacer having a linear output reflector and a parabolic output coupling wall, the output spacer located between the output plate and the common plate;

at least one input probe located between the input plate and the common plate; and

one or more output probes located between the output plate and the common plate.

46. The electromagnetic lens as recited in claim 45, wherein the at least one input probe and the one or more output probes are secured to opposite sides of the common plate.

47. The electromagnetic lens as recited in claim 45, wherein the at least one input probe is located one-quarter wavelength away from the hyperbolic input reflector, and the one or more output probes are located one-quarter wavelength away from the linear output reflector.

48. The electromagnetic lens as recited in claim 45, wherein the hyperbolic input reflector is convex, and the input and output coupling walls are concave.

49. The electromagnetic lens as recited in claim 45, wherein the input spacer is in contact with the input plate and the common plate, and the output spacer is in contact with the output plate and the common plate.

50. The electromagnetic lens as recited in claim 45, wherein the input plate, the input spacer, the common plate, the output spacer, and the output plate are fastened together using at least one of rivets, screws, and bolts.

51. The electromagnetic lens as recited in claim 45, wherein the input plate is substantially parallel to the common plate, and the common plate is substantially parallel to the output plate.

52. The electromagnetic lens as recited in claim 45, wherein the input plate, the input spacer, the common plate, the output spacer, and the output plate are at least one of integrated together and separate from each other.

53. An electromagnetic lens comprising:

a first layer;

a second layer adjacent to the first layer; the second layer including a plurality of input probes, a curvilinear input reflector, and a first curvilinear coupling wall;

a third layer adjacent to the second layer, the third layer including a coupling slot;

a fourth layer adjacent to the third layer; the fourth layer including a plurality of output probes, a curvilinear output reflector, and a second curvilinear coupling wall; and

a fifth layer adjacent to the fourth layer.

54. The electromagnetic lens as recited in claim 53, wherein the first layer and the third layer form an electromagnetic waveguide at the second layer; and wherein the third layer and the fifth layer form another electromagnetic waveguide at the fourth layer.

55. The electromagnetic lens as recited in claim 53, wherein the curvilinear input reflector comprises a non-circular conic section, the curvilinear output reflector comprises a linear section, and each of the first and second curvilinear coupling walls comprises a parabolic section.

56. The electromagnetic lens as recited in claim 53, wherein the curvilinear input reflector comprises a multi-foci extrapolated curved section, the curvilinear output reflector comprises an extrapolated curve section that is related to the multi-foci extrapolated curved section of the curvilinear input reflector, and each of the first and second curvilinear coupling walls comprises a linear section.

57. The electromagnetic lens as recited in claim 53, wherein the electromagnetic lens is configured so that: an electromagnetic wave emanating from at least one input probe of the plurality of input probes is guided along the second layer between the first and third layers to the coupling slot, the electromagnetic wave is directed through the coupling slot from the second layer to the fourth layer, and the electromagnetic wave is guided along the fourth layer between the third and fifth layers to the plurality of output probes.

58. The electromagnetic lens as recited in claim 57, wherein the electromagnetic lens is further configured such that: the electromagnetic wave is guided along the second layer from the plurality of input probes using the curvilinear input reflector, the electromagnetic wave is coupled from the second layer to the fourth layer via the coupling slot using the first and second curvilinear coupling walls, and the electromagnetic wave is guided along the fourth layer to the plurality of output probes using the curvilinear output reflector.

59. The electromagnetic lens as recited in claim 57, wherein the electromagnetic lens is further configured such that: the electromagnetic wave is redirected approximately 180° by a combination of the first curvilinear coupling wall, the coupling slot, and the second curvilinear coupling wall.

60. An access station comprising:

a lens including:

a first layer;

a second layer adjacent to the first layer; the second layer including a plurality of input probes, a curvilinear input reflector, and a first curvilinear coupling wall;

a third layer adjacent to the second layer, the third layer including a coupling slot;

a fourth layer adjacent to the third layer; the fourth layer including a plurality of output probes, a curvilinear output reflector, and a second curvilinear coupling wall; and

a fifth layer adjacent to the fourth layer.

61. The access station as recited in claim 60, wherein at least one of the first layer, the second layer, the third layer, the fourth layer, and the fifth layer is not integrated with another layer.

62. The access station as recited in claim 60, wherein at least one of the first layer, the second layer, the third layer, the fourth layer, and the fifth layer is integrated with another layer.

63. The access station as recited in claim 60, further comprising:

an antenna array that is coupled to the plurality of output probes and that produces a plurality of communication beams;

wherein a first signal that is applied to a first input probe of the plurality of input probes is produced on a first communication beam of the plurality of communication beams, and a second signal that is applied to a second input probe of the plurality of input probes is produced on a second communication beam of the plurality of communication beams.

64. An electromagnetic lens comprising:

a first layer;

a second layer adjacent to the first layer; the second layer including a plurality of input probes, a hyperbolic input reflector, and a first parabolic coupling wall;

a third layer adjacent to the second layer, the third layer including a parabolic coupling slot;

a fourth layer adjacent to the third layer; the fourth layer including a plurality of output probes, a linear output reflector, and a second parabolic coupling wall; and

a fifth layer adjacent to the fourth layer.

65. The electromagnetic lens as recited in claim 64, wherein the first layer is substantially parallel to the third layer, and the third layer is substantially parallel to the fifth layer.

66. The electromagnetic lens as recited in claim 64, wherein the third layer further includes at least one bridge that extends across a gap of the parabolic coupling slot.

67. An electromagnetic lens comprising:

a first layer;

a second layer adjacent to the first layer; the second layer including a plurality of input probes, a multi-foci extrapolated curved reflector, and a first linear coupling wall;

a third layer adjacent to the second layer, the third layer including a linear coupling slot;

a fourth layer adjacent to the third layer; the fourth layer including a plurality of output probes, an extrapolated curved reflector that is related to the multi-foci extrapolated curved reflector, and a second linear coupling wall; and

a fifth layer adjacent to the fourth layer.

68. The electromagnetic lens as recited in claim 67, wherein the extrapolated curved reflector is related to the multi-foci extrapolated curved reflector such that an electromagnetic wave (i) that emanates from at least one input probe of the plurality of input probes and (ii) that is reflected from the multi-foci extrapolated curved reflector and redirected through the linear coupling slot via the first and second linear coupling walls presents a linear phase front at the plurality of output probes after reflection from the extrapolated curved reflector.

69. The electromagnetic lens as recited in claim 67, wherein the multi-foci extrapolated curved reflector establishes a plurality of foci via a plurality of foci zones that are interconnected by a plurality of extrapolation zones.

70. The electromagnetic lens as recited in claim 67, wherein the linear coupling slot is proximate to the first and second linear coupling walls.

71. A method for an access station comprising:

emanating an electromagnetic wave from an input probe;

guiding the electromagnetic wave toward a coupler using a hyperbolic reflector;

collimating the electromagnetic wave at the coupler using a parabolic wall;

guiding the electromagnetic wave from the coupler toward a plurality of output probes; and

collecting the electromagnetic wave at the plurality of output probes using a linear reflector.

72. A method for an access station comprising:

emanating an electromagnetic wave from an input probe;

guiding the electromagnetic wave toward a coupler using a curvilinear input reflector;

redirecting the electromagnetic wave at the coupler using a curvilinear coupling wall;

guiding the electromagnetic wave from the coupler toward a plurality of output probes; and

collecting the electromagnetic wave at the plurality of output probes using a curvilinear output reflector.

73. The method as recited in claim 72, further comprising:

accepting an electromagnetic signal, which corresponds to the electromagnetic wave, at the input probe from a signal processor.

74. The method as recited in claim 72, further comprising:

forwarding the electromagnetic wave or an electromagnetic signal corresponding thereto from the plurality of output probes to an antenna array.

75. The method as recited in claim 74, further comprising:

producing a communication beam from the antenna array, the communication beam carrying the electromagnetic wave or the electromagnetic signal.

76. The method as recited in claim 72, wherein the collecting comprises:

receiving the electromagnetic wave with a different phase at each output probe of the plurality of output probes.

77. The method as recited in claim 76, wherein the receiving comprises:

receiving the electromagnetic wave with a linear phase front at the plurality of output probes.

78. The method as recited in claim 72, wherein the redirecting comprises:

redirecting the electromagnetic wave through a coupling slot at the coupler.

79. The method as recited in claim 72, wherein:

the guiding the electromagnetic wave toward a coupler using a curvilinear input reflector comprises guiding the electromagnetic wave toward the coupler using the curvilinear input reflector that includes a non-circular conic section;

the redirecting the electromagnetic wave at the coupler using a curvilinear coupling wall comprises redirecting the electromagnetic wave at the coupler using the curvilinear coupling wall that includes a parabolic section; and

the collecting the electromagnetic wave at the plurality of output probes using a curvilinear output reflector comprises collecting the electromagnetic wave at the plurality of output probes using the curvilinear output reflector that includes a linear section.

80. The method as recited in claim 72, wherein:

the guiding the electromagnetic wave toward a coupler using a curvilinear input reflector comprises guiding the electromagnetic wave toward the coupler using the curvilinear input reflector that includes a multi-foci extrapolated curved section;

the redirecting the electromagnetic wave at the coupler using a curvilinear coupling wall comprises redirecting the electromagnetic wave at the coupler using the curvilinear coupling wall that includes a linear section; and

the collecting the electromagnetic wave at the plurality of output probes using a curvilinear output reflector comprises collecting the electromagnetic wave at the plurality of output probes using the curvilinear output reflector that includes an extrapolated curved section that is related to the multi-foci extrapolated curved section of the curvilinear input reflector.

81. A method for an access station comprising:

emanating an electromagnetic wave from an input probe;

guiding the electromagnetic wave toward a coupler using a multi-foci extrapolated curved reflector;

redirecting the electromagnetic wave at the coupler using a linear coupling wall and a coupling slot;

guiding the electromagnetic wave from the coupler toward a plurality of output probes; and

collecting the electromagnetic wave at the plurality of output probes using an extrapolated curved reflector that is related to the multi-foci extrapolated curved reflector.

82. The method as recited in claim 81, wherein the collecting comprises:

collecting the electromagnetic wave at the plurality of output probes using the extrapolated curved reflector that is adapted with regard to the multi-foci extrapolated curved reflector so as to establish a linear phase relationship for the electromagnetic wave at the plurality of output probes.

83. An arrangement for an access station comprising:

emanation means for emanating an electromagnetic wave;

collection means for collecting the electromagnetic wave;

first guidance means for guiding the electromagnetic wave from the emanation means toward a curvilinear coupling wall using a curvilinear input reflector;

second guidance means for guiding the electromagnetic wave from the curvilinear coupling wall toward the collection means using a curvilinear output reflector; and

coupling means for coupling the electromagnetic wave from the first guidance means to the second guidance means using the curvilinear coupling wall.

84. The arrangement as recited in claim 83, wherein the arrangement is configured such that the electromagnetic wave is collected by the collection means with a plurality of time delays.

85. The arrangement as recited in claim 83, wherein the coupling means for coupling the electromagnetic wave from the first guidance means to the second guidance means using the curvilinear coupling wall is adapted to couple the electromagnetic wave from the first guidance means to the second guidance means via a coupling slot.